

Educator Guide to Assessment Reports Alaska Science Assessment





Department of Education & Early Development

OFFICE OF THE COMMISSIONER

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Dear Educator,

As part of Alaska's balanced assessment system, assessment happens every day in classrooms across our state. We administer many different assessments to evaluate whether students can demonstrate the knowledge and skills being taught, which helps school leaders and educators identify support and resources for teaching and learning. Assessment is a key part of student learning, and everything we do should work toward this goal.

In spring 2022, the state's summative assessments, the Alaska System of Academic Readiness (AK STAR) and Alaska Science Assessment, were both administered operationally for the first time. With the inception of AK STAR, assessing English language arts and mathematics in grades 3–9, and the Alaska Science Assessment, assessing science in grades 5, 8, and 10, it is the first time in many years that the state had two different approaches for the statewide summative assessments. This means that educators and students used two different platforms for test administration and the format for these assessments involved new item types and interactions. Despite these shifts, the Alaska standards in English Language Arts, mathematics, and science continue to serve as the foundation for the statewide summative assessments.

AK STAR is an innovative, balanced assessment system designed to recognize and celebrate students' strengths and identify areas where a student needs support by connecting to the widely used MAP Growth interim assessment. The Alaska Science Assessment is designed to measure student learning in relation to the three-dimensional expectations of science and engineering practices, disciplinary core ideas, and cross-cutting concepts. With these shifts to a new and different assessment design the results from spring 2022 should not be compared to previous assessments.

During the 2021–2022 school year, many students across the state continued to experience varied modes of teaching and learning due to the ongoing COVID-19 pandemic. Amidst the continued challenges for Alaska's schools during the spring 2022 test administration window, schools and districts should be congratulated for reaching an almost 80% participation statewide.

Alaska is fortunate to have many great schools and passionate educators. Thank you for your hard work to provide an excellent education for every student every day.

Sincerely,

Heidi Teshner Acting Commissioner

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About the Alaska Science Assessment

Overview

The Alaska Science Assessment is administered annually statewide to students in grades 5, 8 and 10 and is a summative assessment designed to measure a student's knowledge of the *K*–12 Science Standards for Alaska, which were adopted in June 2019. The *K*–12 Science Standards for Alaska provide a foundation for defining what students should know and be able to do in terms of scientific knowledge and skills.

State Board of Education's Mission for Public Education in Alaska:
An excellent education for every student every day.

The Alaska Academic Standards in English language arts (ELA), mathematics, and science are used to drive curriculum, instruction, and assessment goals and actions. As illustrated in Figure 1, the academic standards provide the foundation for the curriculum, instruction, and assessment activities in schools and classrooms throughout Alaska. For any assessment to reliably and validly measure student performance on the academic content and skills outlined in the academic standards, both curriculum and instruction must also be aligned to those common expectations. Further, classroom instruction must be responsive to the assessment data, with regular opportunities for adjustment to resources and strategies to address the academic standards.

An Aligned Education System

Academic Standards

Figure 1: Aligned Education System

The K–12 Science Standards for Alaska support learning and understanding through sense making and investigations associated with scientific phenomena in physical science, life science, earth and space science, and engineering and technology. The standards are presented as Performance Expectations and they combine the science and engineering practices, disciplinary core ideas, and cross-cutting concepts into a single statement of what is to be assessed. The Alaska Science Assessment also provides information to help schools improve and to meet the State Board of Education's Mission, "An excellent education for every student every day." For more information about the standards measured by this assessment, visit the K–12 Science Standards for Alaska webpage on the Department of Education and Early Development (DEED) website.

More information can be found on the DEED Alaska Science Assessment webpage.

Educator Use of Information

The Alaska Science Assessment is a **summative assessment**. Summative assessments are designed to provide a snapshot of student, school, or program progress and achievement at the end of a period of instruction. Statewide summative assessments are administered near the end of the school year. The results are used to provide information about the overall status of a student's learning on the state's standards in science. Results of state assessments may be used to measure the effectiveness of an educational program at the school, district, or state level.

The Alaska Science Assessment includes a sufficient number of items to provide an overall picture of an individual student's performance on the grade-level standards, and relative information about how an individual student performed on groups of skills and abilities measured by reporting categories in science.

While the Alaska Science Assessment provides one measure of the knowledge possessed by an individual student, other types of assessment also contribute to the whole picture. The K-12 Science Standards for Alaska support learning and understanding through sense making and investigations associated with scientific phenomena in physical science, life science, earth and space science, and engineering and technology. The standards are presented as Performance Expectations and they combine the science and engineering practices, disciplinary core ideas, and cross-cutting concepts into a single statement of what is to be assessed. These are the elements of Three-Dimensional learning and student work is driven by questions arising from phenomena or by an engineering design problem. Students are supported in connecting their learning across units and courses to build a coherent understanding of science ideas and of the crosscutting concepts. For students to achieve proficiency with respect to all the performance expectations in the Alaska standards, they will need regular opportunities to engage in learning that blends all three dimensions of the standards throughout their classroom experiences, from Kindergarten through High School. Many indicators of student learning, such as classroom work, grades, and local assessments, will create a whole picture of a student's skills and knowledge and can be used to identify which learning goals educators and parents of assessments used in classrooms and schools include:

Curriculum-embedded tests, or program tests, are assessments that are part of the instructional materials being used by teachers or part of the instructional activities routinely taking place.

Diagnostic assessments are evidence-gathering procedures that provide detailed information about which targeted skills and knowledge a student is most struggling to learn. This information is needed by teachers when they decide how to most appropriately design instructional interventions. Due to their time-intensive and specific nature, diagnostic assessments are only used with a small group of students for whom the learning process has broken down and sufficient progress has not been made.

Formative assessment is a process used by teachers and students during instruction. Formative assessment provides feedback to adjust ongoing teaching and learning to improve students' achievement.

Interim assessments are given periodically throughout an academic year in order to provide individual student performance data, which teachers can use to adjust instruction to meet student needs. Interim assessments can also be used to determine the effectiveness of ongoing instructional programs and methods.

Universal screening tests are usually given two or three times during a school year to identify students who may be at risk or to monitor student progress. Universal screening tests focus on targeted, essential skills (such as letter sounds), are brief (1–3 minutes), and are conducted with all students in a grade level.

Statewide summative assessment results at the grade, school, and district level provide information about how the educational system is performing for all students. This information may be used to help inform local decision makers about changes needed to instructional programs, needed additional student support, and professional learning for teachers. The following chart provides ideas about how to use information in each type of report.

Dates of Testing & Reporting

The Alaska Science Assessment was administered from March 28 to April 29, 2022. All reports, including Individual Student Reports, Student Roster Reports, School Summary Reports, and District Summary Reports, will be accessible on the DRC INSIGHT Portal beginning October 24, 2022. Refer to the *Quick Guide for Accessing Reports*. Table 1 lists all reports available for 2022, plus the description and how to use the information contained in each report.

Table 1: Reports Available for 2022

Report Type	Description	How to Use Information
Individual Student Report	 For students, parents, and educators **Contains confidential student information** Provides individual student's scale score, achievement level, comparison to other students, relative performance on reporting categories, and summary achievement level descriptors 	 Useful for understanding how a student performed overall on the standards at a grade level at the end of the school year. Compare a student's performance to other students in the school, district, or state. Draw inferences about the level of student performance relative to specific areas. Based on the reporting categories and student performance in each category, and other classroom- or district-level information available for individual students, educators can use the information about general strengths and weaknesses of individual students for areas needing instructional support possibly in the next school year.
School Summary Report	 For educators and the public Provides summary information for whole school, district, and state Includes number of students tested, percentage in each achievement level, median and mean scale scores, and performance on reporting categories 	 Useful for information about the performance of the educational system at a school, district, or state level. Determine grade level or content areas where program or instruction may be improved to increase student achievement.
District Summary Report	 For educators and the public Provides summary information for whole district and state Includes all information provided in school summary reports 	 Useful for information about the performance of the educational system at a district or state level. Determine grade level or content areas where program or instruction may be improved to increase student achievement.
Student Roster Report	 For use by educators only **Contains confidential student information** Provides the following information for each student in a grade level at a school: scale score, achievement level, performance on reporting categories 	 Useful for seeing individual student information for a subject. See trends in performance on reporting categories. May be useful for educators to consider instructional modifications at a grade level in the next school year.

Test Design

Types of Items

The Alaska Science Assessment contains several different item types. For multiple-choice items, students are asked to select one correct response from four possible answer choices. For multiple-select items, students are asked to select more than one correct response from the answer choices. Technology-

Questions on an assessment are also called items.

enhanced items allow students to demonstrate their knowledge and skills at more complex levels of thinking. Each technology-enhanced item has a similar counterpart item on the accommodated printed versions (large print, braille and print on demand) of the assessment. All items are worth one point each.

Blueprints

A test blueprint describes how the test is designed. It reflects the knowledge, skills, and abilities that are measured on the test. It includes the numbers and types of items and possible points related to the areas of the standards that are tested. A test blueprint is used to guide the writing of items for the test and to ensure that the test is designed to measure the content standards.

The Alaska Science Assessment is designed to measure a student's understanding of the skills and concepts outlined in the *K*–12 Science Standards for Alaska. Blueprints for the Alaska Science Assessment define the number of items and points available in each reporting category for each grade. The reporting categories reflect the domains within the science standards. For more details, view the entire Spring 2022 Alaska Science Assessment Blueprint.

Reporting Categories

Items on the Alaska Science Assessment assess skills in the reporting categories listed in Table 2.

Grade	Reporting Category
Grades 5, 8, and 10	Physical Science
Grades 5, 8, and 10	Life Science
Grades 5 and 8	Earth and Space Science

Table 2: Reporting Categories by Grade Level

Score Interpretation

Achievement Levels

Student performance on the Alaska Science Assessment is reported in one of four overall achievement levels. These levels designate the performance of the student on the standards tested at the grade level. The four achievement levels are: Advanced, Proficient, Approaching Proficient, and Needs Support. <u>Table 3</u> is a general description of what students should be able to do at each overall level.

Table 3: Achievement Levels and Descriptions

Achievement Level	Description
Advanced (A)	Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.
Proficient (P)	Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.
Approaching Proficient (AP)	Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.
Needs Support (NS)	Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.

Achievement Level Descriptors (ALDs)

Achievement Level Descriptors or ALDs are general descriptions of what a student in a specific grade level and subject can do at each achievement level.

Summary ALDs are provided on page 2 of the Alaska Science Assessment Individual Student Reports. These summary statements are based on the full set of ALDs that describe what a student can do at each achievement level in each reporting category. Alaska Science Assessment Summary Statements for all grades can be found in <u>Appendix B</u> of this guide. The full set of ALDs can be viewed on the Alaska Science Assessment Results webpage.

Scores & Score Ranges

Scale Scores and Raw Scores

Student performance on the Alaska Science Assessment is represented by the overall scale score. Scale scores differ from raw scores. A **raw score** is the number of points that a student earns on a test. While raw scores can be used in smaller settings such as classrooms, scale scores are needed for large scale, statewide assessments such as the Alaska Science Assessment.

On the Individual Student Report, each student's raw score is converted to a scale score. A **scale score** is a three-digit number that provides a common measure for expressing student performance across different forms of a test. Scale scores have the same meaning when students take different forms of the test (e.g., standard test versus braille test, tests in different years). Using a scale score provides consistent reporting of scores from year to year for each grade. The scale can be represented as a line that is divided into four levels of achievement (advanced, proficient, approaching proficient, and needs support).

Standard Error of Measurement

The **standard error of measurement** (SEM), shown in <u>Figure 2</u>, provides information about the level of confidence that a student would achieve the same score if that student tested again on an equivalent form of the test without changing knowledge or skills. The SEM is specific for the particular grade. On the Individual Student Report, the black circle in the symbol on the graph indicates the student's scale score on the test, and the bars on either side of the black circle represent the range of possible scores the student could receive within the SEM.

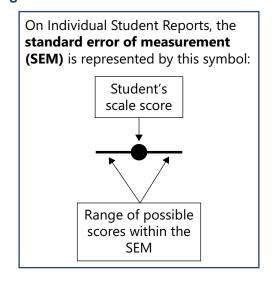


Figure 2: Standard Error of Measurement

Score Ranges for Achievement Levels

Each achievement level is defined by a range of scale scores. Alaska educators gathered in June 2022 to recommend what the minimum test score should be to attain each achievement level. These score ranges are different for each grade. With input from DEED, and after a period of public comment, the Alaska State Board of Education and Early Development approved the score ranges for the Alaska Science Assessment.

Alaska Science Assessment Score Ranges

For science in each grade, the Alaska Science Assessment scores range from 400–800, as shown in Table 4.

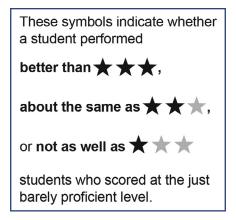
Proficient Needs Support Grade **Approaching Advanced** 580-615 5 400-579 673-800 616-672 8 400-585 586-612 613-655 656-800 10 400-570 571-600 601-641 642-800

Table 4: Score Ranges by Achievement Level

Reporting Categories

On Individual Student Reports, student performance in each reporting category is reported as a comparison to students who performed at the proficient level, as shown in <u>Figure 3</u>. This provides relative information about the student's performance in each reporting category. Due to test length and timing constraints, there are not a sufficient number of items in each reporting category to enable a separate scale score or achievement level to be reported.

Figure 3: Individual Student Report Performance Results Key



Grade 5

The performance expectations for grades 3–5 blend core ideas with science and engineering practices and crosscutting concepts to support students in developing useable knowledge that can be applied between life science, physical science, and earth and space science. Practices are the actions that students are engaged in as they actively learn. The Science and Engineering Practices include asking questions and defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using Mathematics and computational thinking, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information.

Grade 5 Life Science Reporting Category

By the end of grade 5 students develop understanding of key concepts that help them make sense of life science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are four core ideas: 1) Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms, 2) Inheritance and Variation of Traits: Life Cycles and Traits, 3) Structure, Function, and Information Processing, and 4) Matter and Energy in Organisms and Ecosystems. While the performance expectations in grades 3–5 life science link particular practices with specific core ideas, classroom instruction should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrate some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are likely able to answer questions such as: "How does matter cycle through ecosystems?" and "Where does the energy in food come from and what is it used for?" By developing models, students can describe the movement of matter among organisms and the environment and that energy in animals' food was once energy from the Sun.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are typically able to understand the movement of matter among plants, animals, decomposers, and the environment. Crosscutting concepts of matter and energy, systems and system models, and cause and effect are used by students to support understanding the phenomena related to matter and energy in an ecosystem.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are likely able to ask and partially answer a question such as: "What are some examples of matter cycling through an ecosystem?" These students can apply given explanations to phenomena but need more support in developing their own explanations related to constructing arguments help make sense of matter and energy within an ecosystem. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 5 Physical Science Reporting Category

By the end of grade 5 students develop understanding of key concepts that help them make sense of physical science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are four core ideas: 1) Forces and Interactions, 2) Energy, 3) Waves, and 4) Structure and Properties of Matter. While the performance expectations in grades 3–5 physical science link particular practices with specific core ideas, classroom instructional should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrates some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core idea Structure and Properties of Matter, these students are likely able to answer a question such as: "When matter changes, does its weight change? Students have an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students can make observations and measurements to identify materials based on their properties. Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core idea Structure and Properties of Matter, these students are likely able to measure or possibly graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. These students can also partially understand reactions or changes including phase changes, dissolving, and mixing that can form a new substance.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core idea Structure and Properties of Matter, these students are likely able to answer a question such as "What are some examples of changes in weight?" These students can likely recognize examples of properties such as color, hardness, reflectivity, electrical conductivity, and thermal conductivity. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 5 Earth and Space Reporting Category

By the end of grade 5 students develop understanding of key concepts that help them make sense of earth and space science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are four core ideas: 1) Weather and Climate, 2) Earth's Systems: Processes that Shape the Earth, 3) Earth's Systems, and 4) Space Systems: Stars and the Solar System. While the performance expectations in grades 3–5 earth and space science link particular practices with specific core ideas, classroom instructional should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrates some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core idea Space Systems: Stars and the Solar System, these students are likely able to answer a question such as "Why is there a seasonal appearance of some stars in the night sky?" These students understand how to demonstrate patterns related to the length and direction of shadows on Earth and the day/night cycle. In addition, these students can construct an argument related to the idea that gravitational force exerted by Earth on objects is directed toward the center of the Earth.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core idea Space Systems: Stars and the Solar System, these students are likely able to demonstrate a working understanding of patterns related to the appearance of the Moon. These students can likely make predictions of how gravitational force, exerted by Earth, can affect objects.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core idea Space Systems: Stars and the Solar System, these students are likely able to answer a question such as "What causes the daily changes in length and direction of shadows in Earth?" These students can use data to recognize examples of changes in the day/night cycle. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 8

The performance expectations for grades 6–8 blend core ideas with science and engineering practices and crosscutting concepts to support students in developing useable knowledge that can be applied between life science, physical science, and earth and space science. Practices are the actions that students are engaged in as they actively learn. The Science and Engineering Practices include asking questions and defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using Mathematics and computational thinking, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information.

Grade 8 Life Science Reporting Category

By the end of grade 8 students develop understanding of key concepts that help them make sense of life science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are five core ideas: 1) Structure, Function, and Information Processing, 2) Matter and Energy in Organisms and Ecosystems, 3) Interdependent Relationships in Ecosystems, 4) Growth, Development, and Reproduction of Organisms, and 5) Natural Selection and Adaptations. While the performance expectations in grades 6–8 life science link particular practices with specific core ideas, classroom instruction should include the use of many practices underlying the performance expectations. The concepts and practices in the performance expectations are based on the grade-band endpoints described in *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas* (National Research Council, 2012).

Students achieving 3 stars meet the performance standards and demonstrate some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core idea Interdependent Relationships in Ecosystems, these students are likely able to answer the question: "How do organisms interact with other organisms in the physical environment to obtain matter and energy?" They can construct explanations for the interactions in ecosystems and the scientific, economic, and social justifications used in making decisions about maintaining biodiversity in ecosystems. Students can use models, construct evidence-based explanations, and use argumentation from evidence.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core idea Interdependent Relationships in Ecosystems, these students are typically able to understand that organisms and populations of organisms are dependent on their environmental interactions both with other organisms and with nonliving factors. They also understand the limits of resources influence the growth of organisms and populations, which may result in competition for those limited resources. Crosscutting concepts of matter and energy, systems and system models, and cause and effect are used by students to support understanding the phenomena they study.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core idea Interdependent Relationships in Ecosystems, these students are likely able to ask and partially answer a question such as: "How does an organism interact with its physical environment to obtain matter and energy?" These students can apply given explanations to phenomena but need more support in developing their own explanations related to constructing arguments help make sense of matter and energy within an ecosystem. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 8 Physical Science Reporting Category

By the end of grade 8 students develop understanding of key concepts that help them make sense of physical science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are five core ideas: 1) Structure and Properties of Matter, 2) Chemical Reactions, 3) Forces and Interactions, 4) Energy, and 5) Waves and Electromagnetic Radiation. While the performance expectations in grades 6–8 physical science link particular practices with specific core ideas, classroom instructional should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrates some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core idea Chemical Reactions, these students are likely able to answer a question such as "What happens when new materials are formed? What stays the same and what changes?" by building understanding of what occurs at the atomic and molecular scale during chemical reactions. In addition, these students can develop and use models to demonstrate that chemical reactions involve regrouping of atoms to form new substances, and that atoms rearrange during chemical reactions.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core idea Chemical Reactions, these students are likely able to understand parts of the design and the process of optimization in engineering to chemical reaction systems. These students can also partially analyze and interpret data sets while recognizing patterns related to chemical reactions.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core idea Chemical Reactions, these students are likely able to answer a question such as "What are some examples of evidence that a new material has been formed?" These students can likely recognize existing design solutions to a given problem. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 8 Earth and Space Reporting Category

By the end of grade 8 students develop understanding of key concepts that help them make sense of earth and space science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are six core ideas: 1) Space Systems, 2) History of Earth, 3) Earth's Interior Systems, 4) Earth's Surface Systems, 5) Weather and Climate, and 6) Human Impacts. While the performance expectations in grades 6–8 earth and space science link particular practices with specific core ideas, classroom instructional should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrates some mastery of the knowledge and skills on a range of complex grade-level content.

Achievement Examples: for the core ideas Earth's Interior and Surface Systems, these students are likely able to answer a question such as "What are the causes and the outcomes of the cycling of water through Earth's systems?" These students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. In addition, these students can investigate the controlling properties of important materials and construct explanations based on the analysis of real geoscience data.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some grade-level content.

Achievement Examples: for the core ideas Earth's Interior and Surface Systems, these students are likely able to demonstrate a working understanding on ways that geoscience processes provide resources needed by society but also cause natural hazards that present risks to society; both involve technological challenges, for the identification and development of resources and for the mitigation of hazards.

Students achieving 1 star may partially meet the performance standards but need support to master the knowledge and skills of current grade-level content.

Achievement Examples: for the core ideas Earth's Interior and Surface Systems, these students are likely able to answer a question such as ""What causes the cycling of water through Earth's systems?" These students can recognize examples of how the flow of energy and cycling of matter can impact Earth's geosystems. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

High School

The performance expectations for high school life science blend core ideas with science and engineering practices and crosscutting concepts to support students in developing useable knowledge that can be applied across both life science and physical science. Practices are the actions that students are engaged in as they actively learn. The Science and Engineering Practices include asking questions and defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using Mathematics and computational thinking, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information.

Grade 10 Life Science Reporting Category

By the end of grade 10 students develop understanding of key concepts that help them make sense of life science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are five core ideas: 1) Structure and Function, 2) Inheritance and Variation of Traits, 3) Matter and Energy in Organisms and Ecosystems, 4) Interdependent Relationships in Ecosystems, and 5) Natural Selection and Evolution. While the performance expectations in high school life science link particular practices with specific core ideas, classroom instruction should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrate some mastery of the knowledge and skills on a range of complex high school content.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are likely able to answer questions such as: "How do organisms obtain and use energy they need to live and grow?" and "How do matter and energy move through ecosystems?" They can construct explanations of the role of energy in the cycling of matter in organisms and ecosystems. They can apply mathematical concepts to develop evidence to support explanations of the interactions of photosynthesis and cellular respiration and develop models to communicate these explanations.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some high school content.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are typically able to relate their understanding of the tentative nature of science to how explanations may change based on new evidence. Students understand organisms' interactions with each other and their physical environment, how organisms obtain resources and change the environment, and how changes to the environment can affect organisms and/or ecosystems. In addition, students can utilize the crosscutting concepts of Matter and Energy and Systems and System Models to make some sense of ecosystem dynamics.

Students achieving 1 star may partially meet the performance standards but need support to master the blending of knowledge and skills at the high school level.

Achievement Examples: for the core idea Matter and Energy in Organisms and Ecosystems, these students are likely able to ask and partially answer questions such as: "How do organisms obtain the energy they need to live and grow? and "Do matter and energy move through ecosystems?" These students can use given models but need more support in developing models that represent the use of systems and system models to make sense of ecosystem dynamics. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Grade 10 Physical Science Reporting Category

By the end of grade 10 students develop understanding of key concepts that help them make sense of physical science. The concepts build upon students' science knowledge and skills related to three, interrelated categories: core ideas, science and engineering practices, and crosscutting concepts. There are five core ideas: 1) Structure and Properties of Matter, 2) Chemical Reactions, 3) Forces and Interactions, 4) Energy, and 5) Waves and Electromagnetic Radiation. While the performance expectations in high school physical science link particular practices with specific core ideas, classroom instructional should include the use of many practices underlying the performance expectations.

Students achieving 3 stars meet the performance standards and demonstrates some mastery of the knowledge and skills on a range of complex high school content.

Achievement Examples: for the core idea Energy, these students are likely able to answer a question such as "How is energy transferred and conserved?" These students understand energy as a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. In addition, these students understand that the total change of energy in any system is always equal to the total energy transferred into or out of the system and they can develop and use models representing energy at both the macroscopic scale and the atomic scale.

Students achieving 2 stars partially meet the performance standards and may have gaps in knowledge and skills but are approaching mastery of some high school content.

Achievement Examples: for the core idea Energy, these students are likely able to demonstrate a working understanding of engineering principles when they analyze the design of technological devices and/or determine beneficial refinements. Possible devices include: Rube Goldberg machines, wind turbines, solar cells, solar ovens, and generators.

Students achieving 1 star may partially meet the performance standards but need support to master the blending of knowledge and skills at the high school level.

Achievement Examples: for the core idea Energy, these students are likely able to answer a question such as "What are some examples of energy transfer?" These students can recognize various forms of energy. Instructional supports that include a blending of practices, core ideas, and crosscutting concepts are recommended.

Further Information

Please refer to the K–12 Science Standards for Alaska which are based on the National Research Council's A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012). Also, there are example Achievement Level Descriptors (ALDs) that describe what a typical student scoring at each achievement level can do. A student would not necessarily demonstrate all the example knowledge and skills listed for a particular achievement level on a particular test to score at that level.

K-12 Science Standards for Alaska

<u>A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas</u>

Alaska Achievement Level Descriptors

Reporting Scores for Groups of Students

To show how students are performing at the school, district, and state levels, Individual Student Reports display a horizontal gray bar with the median scale score displayed within the bar.

School Summary Reports and District Summary Reports display both the median and the mean scale scores for each grouping of students.

Use of Median

The **median** is the middle number in an ordered list of numbers. Half of the scores are above the median score and half of the scores are below the median. The median is a way to describe the midpoint score in a group of scores. Unlike the mean (sometimes called the average), the median is not affected by scores that are very high or very low when compared to most other scores. Even if there are very high or very low scores that differ largely from most other scores, the median will be in the same position. On the School and District Summary Reports, the red bar represents the lowest possible score to the median at the end (illustrated in Figure 4).

Use of Mean

The **mean** (sometimes called the average) is calculated by adding the values of a set of scores and dividing by the number of scores in the set. The School and District Summary Reports represent the mean scale score along with the standard error of estimate. The School Summary Report displays the mean for the school, district and state, while the District Summary Report only displays the mean for the district and state.

Standard Error of Estimate (SEE)

The **standard error of estimate** (SEE), illustrated in <u>Figure 4</u>, provides information about the level of confidence that a sample of students would achieve the same mean score if another sample was tested. The SEE is specific for the particular grade summary group (school, district, or state). The larger the size of the group being reported, the smaller the SEE will be. At the state level, the SEE will be the smallest. When the summary group includes more students, there is greater confidence that the mean score fairly represents the average of all students' scores. On the Summary Reports, the black circle indicates the mean score for that group, and the bars on either side of the black circle represent the possible range of mean scores the group could have received within the SEE.

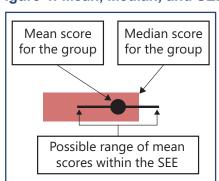


Figure 4: Mean, Median, and SEE

Reporting Categories for Groups of Students

On School and District Summary Reports, performance in each reporting category is reported based on the mean of students' scores in that category at the school, district, or state level. The mean score is compared to the proficient score for the reporting category, within the SEE for the group being reported. Note that the SEE is larger for smaller groups of students; therefore the reported symbol may be different for a small school or district than it would be for a large school or district. For example, a district may be shown as performing *not as well as* the state standard on a particular reporting category, while a very small school in the district with the same mean score may be shown as performing *about the same as* the state standard, due to the difference in the SEE for the small number of students in the school as compared to the district. Performance on the reporting categories, as shown in Figure 5, provides relative information about groups of students to help inform areas where instruction may be improved.

For Summary Reports, these symbols indicate whether the students in the school, district, or state performed, on average:

better than ,

about the same as ,

or not as well as

the state standard for proficiency on that category or standard.

Figure 5: Summary Reports Performance Results Key

Special Circumstances

If a student does not take a test or the test is not scored, school districts document the situation using a Special Circumstances code. Circumstances in which a student does not test would include: absence, extended illness requiring a medical waiver, parent refusal, student refusal, or student transfer. Reasons a student's test was not scored would include security violations or misadministration which resulted in an invalidation. Additionally, if a student does not attempt at least five test items, the assessment is not scored. Special Circumstance codes are listed in Table 5.

Table 5: Special Circumstances Codes

Code	Special Circumstance
ABS	Absent
INV	Invalid
MED	Medical Waiver
NOA	Not Attempted
PRF	Parent Refusal
SRF	Student Refusal
TRN	Transferred

Individual Student Reports with Special Circumstances

If a student did not receive a valid score, an Individual Student Report will not be printed.

Student Roster Reports with Special Circumstances

Students that did not test due to a special circumstance listed above will have a three-character special circumstance code located on the Student Roster Report in the achievement level column, as shown in Figure 6.

Figure 6: Example of Special Circumstance Codes on Student Roster Reports

r	- 29	Reporting Categorie			ories	
Student Name	AKSID	Scale Score	Achievement Level	Life Science	Physical Science	Earth and Space Science
StudentLastName StudentFirstName	123456	356	Proficient	=	Δ	∇
StudentLastName StudentFirstName	789012	270	Approaching	8	8	▽
StudentLastName StudentFirstName	123456	280	Approaching	Δ	▽	=
StudentLastName StudentFirstName	789012		INV			
StudentLastName StudentFirstName	123456	200	Needs Support	∇	▽	8
StudentLastName StudentFirstName	789012	460	Advanced	Δ	Δ	Δ
StudentLastName StudentFirstName	123456		NOA			
StudentLastName StudentFirstName	789012	330	Proficient	Δ	=	=
StudentLastName StudentFirstName	123456	245	Approaching	8	8	▽
StudentLastName StudentFirstName	789012		PRF			

School or District Summary Reports with Special Circumstances

Special circumstance codes do not appear on School Summary Reports or District Summary Reports.

Data Privacy

DEED employs suppression rules in public reporting to protect student privacy. Alaska Science Assessment reports have been designed to protect student privacy. Summary data at the school, district, and/or state level will not be displayed on reports when fewer than five students have tested. If fewer than five students tested in a grade level at the school or district level, Individual Student Reports will show *Data not shown to protect student privacy*. Not showing results on a report in order to protect student privacy is referred to as **suppression**. On School and District Summary Reports, there are additional suppression rules to guard against reporting assessment data that could be linked to an individual student.

Primary Data Suppression Guidelines

- 1. If the number of students tested is less than five, results are suppressed.
- 2. Even when the count of tested students is five or more, there are certain distributions of students that require the publication of a percentage range instead of an exact percentage. School or district reports will display percentage ranges, rather than specific percentages, if either of the following criteria (a. or b.) are true for a particular grade.
 - a. All scores fall into only two achievement levels.

If only two achievement levels have values reported, and the number of students in one of those achievement levels is zero, one or two, the number of students will be eliminated in all achievement levels and the percentage of students at each achievement level will be reported as a range. Ranges will be reported according to Table 6.

Table 6: Suppression Ranges for Scores in Two Levels

Number of students tested	Range displayed Range displated for the level with the most students three level	
5–7	≥60%	≤40%
8–9	≥75%	≤25%
10–19	≥80%	≤20%
20–39	≥90%	≤10%
40 or more	≥95%	≤5%

b. All scores fall into one achievement level.

If all student scores fall within only one of the four levels for a grade, percentage ranges rather than specific percentages will also be displayed. The range displayed will depend on the number of students tested in the grade according to Table 7.

Table 7: Suppression Ranges when Scores Fall in One Level

Number of students tested	Range displayed for the level with student count > 0	Range displayed for the other three levels
5–7	≥60%	≤40%
8–9	≥75%	≤25%
10–19	≥80%	≤20%
20–39	≥90%	≤10%
40 or more	≥95%	≤5%

Secondary Data Suppression Guidelines

Applying the primary suppression rules sometimes creates a situation where the suppressed value may be determined by using the remaining unsuppressed information. The solution to this situation is to apply **secondary suppression**.

Secondary suppression will be applied when a suppressed value can still be determined using the remaining unsuppressed information. Secondary suppression is applied by ensuring that no schools or at least two schools have values suppressed by either of the two primary suppression rules (see page 21). If only one school for a grade within a district triggered primary suppression, then the school with the lowest enrollment for that grade (that is not already suppressed) will have its data suppressed as well. This second school will have its data suppressed using all the same rules and requirements as if the school had fewer than five students.

Secondary suppression will be applied to the school-level median scale score on the Individual Student Reports and all applicable school-level information on the Summary Reports.

Secondary Suppression Example 1

<u>Table 8</u> provides an example of secondary suppression applied to a district (District 1) with four schools (Schools A, B, C, and D). An 'X' denotes that primary suppression has been applied.

Table 8: District 1

Grade	School A	School B	School C	School D	Secondary Suppression needed?
5			X		Yes
8	X		Х		No
10					No

For District 1, secondary suppression is necessary in grade 5 because only one school in the district was subject to primary suppression. In each grade 5, the school – not already subject to primary suppression – with the lowest number of tested students will have data suppressed by the rules of secondary suppression. Secondary suppression is not necessary in grade 8 because two schools had suppressed performance following application of the primary suppression rules, and it is not necessary in grade 10 because no schools had data suppressed.

Secondary Suppression Example 2

Table 9: District 2

Grade	School E	School F	School G	Secondary Suppression needed?
5	Х		Х	No
8			Х	Yes
10	Х	Х	Х	No

<u>Table 9</u> provides an example of a district with three schools (E, F, and G). Secondary suppression is only necessary in grade 8 because grade 8 is the only grade in which just one school was subject to primary suppression. Again, secondary suppression will be applied to the school with the lowest number of tested students not subject to primary suppression.

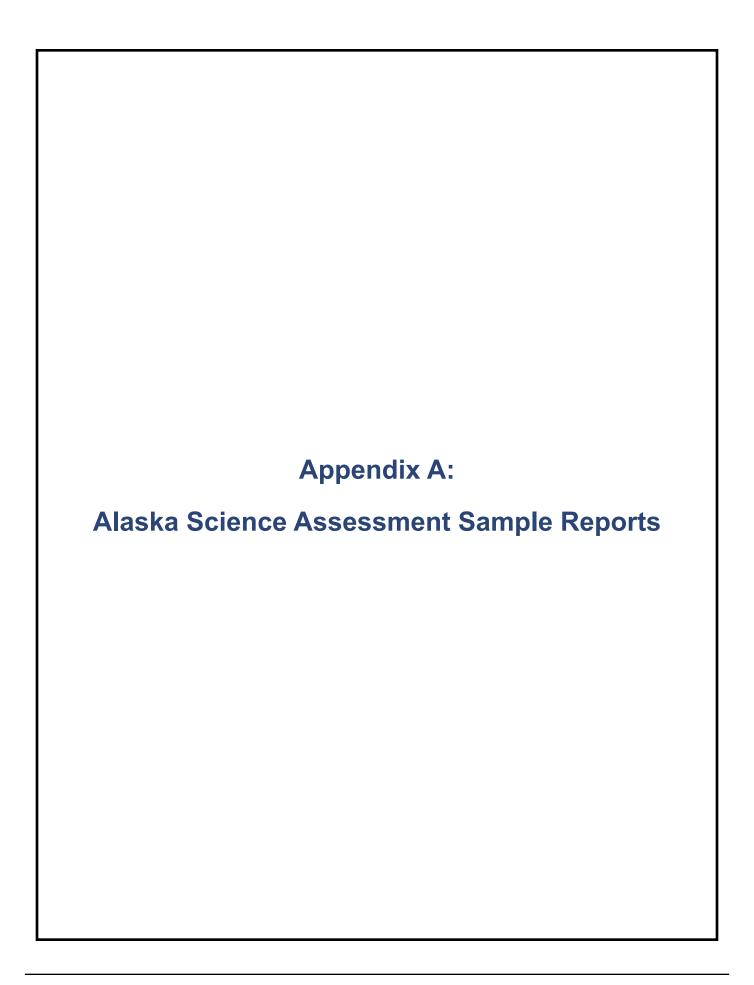
Downloading Reports

All of the reports can be downloaded from the DRC INSIGHT Portal. Superintendents and District Test Coordinators have access to download all report types (Individual Student Reports, Student Roster Reports, School Summary Reports, and District Summary Reports). Other DRC INSIGHT Portal users have permissions to access reports based on how permissions were set up by the District Test Coordinator (DTC).

To access reports, log into the <u>DRC INSIGHT Portal</u> and open the *My Applications* menu bar and click *Report Delivery*. Select *View Reports* and make the proper selections in the dropdown fields (some fields will pre-populate). Then select *Show Reports* and two action buttons will appear to *Open PDF* or *Save PDF*.

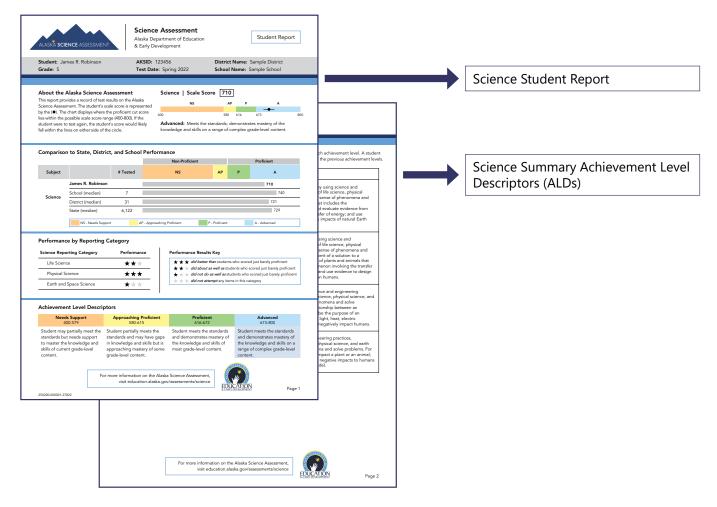
Appendices

- A. Alaska Science Assessment Sample Reports
- B. Achievement Level Descriptor Summary Statements



Sample Reports

Alaska Science Assessment Individual Student Report



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Alaska Science Assessment Individual Student Report



Science Assessment

Alaska Department of Education & Early Development

Student Report

Student: James R. Robinson

Grade: 5

A

AKSID: 123456

Test Date: Spring 2022

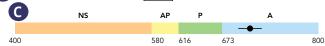
District Name: Sample District

School Name: Sample School

About the Alaska Science Assessment

This report provides a record of test results on the Alaska Science Assessment. The student's scale score is represented by the (•). The chart displays where the proficient cut score lies within the possible scale score range (400-800). If the student were to test again, the student's score would likely fall within the lines on either side of the circle.





Advanced: Meets the standards; demonstrates mastery of the knowledge and skills on a range of complex grade-level content.

E Comparison to State, District, and School Performance

			Non-Proficient		Proficient	
Subject		# Tested	NS	AP	Р	Α
	James R. Robinson					710
Science	School (median)	7				740
	District (median)	31				721
	State (median)	6,122				729
	NS - Needs Support	A	FF 5	- Proficient		A - Advanced

Performance by Reporting Category

Science Reporting Category

Life Science ★★★

Physical Science ★★★

Earth and Space Science

G Performance Results Key

- \bigstar \bigstar did better than students who scored just barely proficient
- $\bigstar \bigstar \%$ did about as well as students who scored just barely proficient
- $\bigstar \star \star did$ not do as well as students who scored just barely proficient
 - $\star\star$ did not attempt any items in this category

H Achievement Level Descriptors

Needs Support Approachin 400-579 580-

Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.

Approaching Proficient 580-615

Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.

616-672 udent meets the sta

Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.

Proficient

Advanced 673-800

Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.

For more information on the Alaska Science Assessment, visit education.alaska.gov/assessments/science



Page 1

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Alaska Science Assessment Individual Student Report (continued)

- A This section presents student, school, and district information. Note that this report is confidential and not for distribution to anyone not authorized to have access to the information.
- B The number in the box indicates the student's scale scores. *Please note*: If the student did not attempt the test or if the student did not receive a valid score, an Individual Student Report will not be generated. See page 19 for more information about the specific circumstances that would result in a student seeing "Invalid" or "Did Not Attempt" in the Scale Score box.
- The horizontal bar graphically illustrates the student's scale score and the location of that score in the achievement level attained by the student. The dark circle in the symbol (→) represents the student's actual scale score. The bars on the sides of the circle represent the range of where the student's score would likely fall if the student were to test again. This represents the standard error of measurement (SEM). See page 7 for more information on the SEM.
- This section describes the student's achievement level determined by the scale score reported in B. See page 6 for more information about achievement levels.
- This section shows the student's scale score and how it compares to the median scores at the school, district, and state levels. See page 18 for more information about use of the median. If one of the horizontal bars for the school or district is replaced with a statement about student privacy, see the Data Privacy section on page 21 of this guide.
- This section shows a comparison of how the student performed in the reporting categories. The symbols indicate how the student performed compared to students who score just barely at the proficient level. See page 8 of this guide for more information on student performance on reporting categories.
- G This section shows the Performance Results Key, which provides the meaning of the number of stars that appear in the Reporting Category section.
- This section provides general descriptions of what a student in this grade level can do at each achievement level. Find the student's achievement level at the top of the report and read the description to learn more about the content and skills that the student demonstrated and see what content and skills would be demonstrated by students reaching a higher achievement level on the Alaska Science Assessment. A complete set of the Summary Achievement Level Descriptors can be found in Appendix B.

Alaska Science Assessment Individual Student Report (continued)

Summary Achievement Level Descriptors (ALDs)

These are example descriptions of what a student at the end of this grade-level knows and can do at each achievement level. A student who scores at an achievement level would also be expected to demonstrate the knowledge and skills at the previous achievement levels.

Achievement Levels	Science				
Advanced 673-800	The student displays a highly developed conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can construct an argument that includes the interdependence of organisms in a changing environment; obtain and evaluate evidence from multiple sources to design a solution to a problem involving the transfer of energy; and use evidence to generate and evaluate multiple solutions that reduce the impacts of natural Earth processes on humans based on criteria and constraints.				
Proficient 616-672	The student demonstrates a sufficient conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can make a claim about the merit of a solution to a problem caused when an environment changes and affects the types of plants and animals that live there; plan and conduct an investigation that fairly tests a phenomenon involving the transfer of energy (e.g., moving objects, sound, light, heat, electric currents); and use evidence to design a possible solution to reduce the impacts of natural Earth processes on humans.				
Approaching Proficient 580-615	The student shows a foundational understanding by using some science and engineering practices, crosscutting concepts, and a partial understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can explain a cause-and-effect relationship between an environmental change and an organism responding to stimuli; describe the purpose of an investigation related to energy transfer (e.g., moving objects, sound, light, heat, electric currents); and use evidence to describe how natural Earth processes negatively impact humans.				
Needs Support 400-579	The student shows a basic understanding by using science and engineering practices, crosscutting concepts, and/or a basic understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can identify an environmental change that could impact a plant or an animal; identify examples showing a transfer of energy; and identify possible negative impacts to humans from a natural Earth process (e.g., earthquake, volcano, flood, landslide).				



For more information on the Alaska Science Assessment, visit education.alaska.gov/assessments/science



Page 2

Alaska Science Assessment Individual Student Report (continued)

This section provides summary descriptions of what a student in this grade level can do at each achievement level. A student who scores at an achievement level would also be expected to demonstrate the skills at the previous achievement levels.

Alaska Science Assessment Student Roster Report



Science Assessment

Alaska Department of Education & Early Development

Student Roster Report

Grade: 5

Test Date: Spring 2022



District Name: Sample District **School Name:** Sample School

		G		Reporting Categories		
Student Name	AKSID	Scale Score	Achievement Level	Life Science	Physical Science	Earth and Space Science
StudentLastName StudentFirstName	123456	650	Proficient	11	Δ	∇
StudentLastName StudentFirstName	789012	570	Needs Support	Ш	=	∇
StudentLastName StudentFirstName	123456	580	Approaching Proficient	Δ	∇	=
StudentLastName StudentFirstName	789012		INV			
StudentLastName StudentFirstName	123456	400	Needs Support	▽	∇	=
StudentLastName StudentFirstName	789012	673	Advanced	Δ	Δ	Δ
StudentLastName StudentFirstName	123456	1	NOA			
StudentLastName StudentFirstName	789012	630	Proficient	Δ	=	=
StudentLastName StudentFirstName	123456	579	Needs Support	11	=	∇
StudentLastName StudentFirstName	789012		PRF			
StudentLastName StudentFirstName	123456	656	Proficient	Ш	Δ	∇
StudentLastName StudentFirstName	789012	572	Needs Support	11	=	∇
StudentLastName StudentFirstName	123456	585	Approaching Proficient	Δ	∇	=
StudentLastName StudentFirstName	789012		INV			
StudentLastName StudentFirstName	123456	500	Needs Support	∇	∇	=
StudentLastName StudentFirstName	789012	676	Advanced	Δ	Δ	Δ
StudentLastName StudentFirstName	123456		MED			
StudentLastName StudentFirstName	789012	644	Proficient	Δ	=	=
StudentLastName StudentFirstName	123456	594	Approaching Proficient	11	=	∇
StudentLastName StudentFirstName	789012		PRF			

Achievement Levels Advanced = 673-800 Proficient = 616-672

Approaching Proficient = 580-615 Needs Support = 400-579 Special Circumstance Codes
ABS: Absent

INV: Invalid TRN: Transferred NOA: Not Attempted MED: Medical Waiver

PRF: Parent Refusal **SRF:** Student Refusal

Performance Results Key Your student

 \triangle did better than students who scored just barely proficient

did about as well as students who scored just barely proficient

∇ did not do as well as students who scored just barely proficient

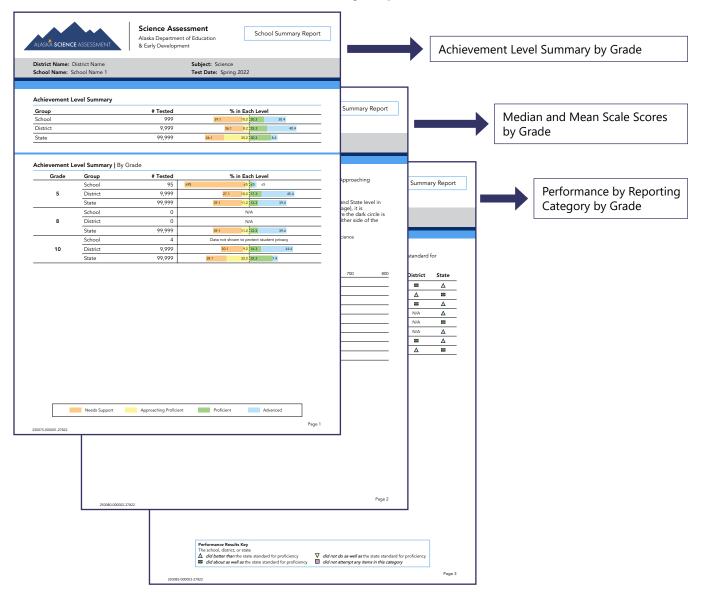
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Page 1 of 2

Alaska Science Assessment Student Roster Report (continued)

- A This section presents school and district information. Note that this report is confidential and not for distribution to anyone not authorized to have access to the information.
- B This section shows students at the tested grade level within the school, sorted alphabetically by last name. The Alaska Student ID number is also included.
- This section shows the student's scale score. Students that have a blank in this column did not take the assessment due to a special circumstance.
- D This section indicates the achievement level earned by the student. If a student has a blank scale score, this column will include the special circumstance code that indicates the reason. Further information regarding achievement levels and special circumstances codes can be found by G, H, and on pages 6 and 19 of this guide.
- This section indicates the reporting categories tested for this grade level, as well as a symbol representing each student's performance in that reporting category. Further information regarding reporting category symbols and numbers can be found in **F** and on page 19 of this guide.
- This section shows the Performance Results Key, which provides the meaning of each of the four symbols used to report the student performance.
- G This section shows the four achievement levels that can be earned on the Alaska Science Assessment, as well as the score ranges for each achievement level at this grade level.
- H This section shows special circumstances codes that may indicate why a student did not receive a scale score. More information on special circumstances codes can be found on page 19 of this guide.

Alaska Science Assessment School Summary Report



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Science Assessment

Alaska Department of Education & Early Development

School Summary Report

District Name: District Name **School Name:** School Name 1

A

Subject: Science

Test Date: Spring 2022

B Achievement Level Summary

Group	# Tested	%	in Each	Level
School	999	39.1	10.2 20	30.4
District	9,999	26.1	8.2 25	3 40.4
State	99,999	26.1	35.2 30	3 8.4

D Achievement Level Summary | By Grade

Grade	Group	# Tested	% in Each Level
	School	95	≥95 ≤5 ≤5 ≤5
5	District	9,999	27.1 10.2 17.3 45.4
	State	99,999	39.1 11.2 12.3 39.4
	School	0	N/A
8	District	0	N/A
	State	99,999	39.1 11.2 12.3 39.4
	School	4	Data not shown to protect student privacy
10	District	9,999	30.1 9.2 16.3 44.4
	State	99,999	28.1 32.2 32.3 7.4



NOTE: If N/A is reported on the Summary Report this indicates that no students tested in that particular grade.

- A This section presents the school and district information.
- B This section shows the Achievement Level Summary: the number of students tested within the school, as well as the percentage of students that scored within each achievement level. For comparison, this table also shows the number of students that tested within the district, as well as the full population of students that tested within the state. Additionally, the percentages of students that scored in each achievement level within the district and state are shown to assist with comparison. Note: if the horizontal bar is replaced with a statement about student privacy, or if the data is displayed in ranges instead of a specific percentage, see the Data Privacy section and data suppression rules on pages 21–23 of this guide.
- This is the key that shows each color representing each achievement level within the horizontal graphs on page 1 of the School Summary Report.
- This section shows the Achievement Level Summary by Grade: the number of students tested within the school broken down by grade level, as well as the percentage of students that scored within each achievement level. Again, district and state percentages are shown for comparison. Note: if the horizontal bar is replaced with a statement about student privacy, or if the data is displayed in ranges instead of a specific percentage, see the Data Privacy section and data suppression rules on pages 21–23 of this guide.



School Summary Report

District Name:District NameSubject:ScienceSchool Name:School Name 1Test Date:Spring 2022

Achievement Levels

Overall scores on the Science Assessment are divided into four achievement levels: Needs Support, Approaching Proficient, Proficient, and Advanced.

Median Scale Scores

The number of students, median scale score, and standard error are reported at the School, District, and State level in the table below. The median is the middle number in an ordered list of numbers. Unlike a mean (average), it is unaffected by very low or very high test scores. The —— symbol shows the students' scale score where the dark circle is the score. If the students were to test again, the students' scores would likely fall within the lines on either side of the circle. The standard error decreases as the sample size increases.

For more information on the Alaska Science Assessment please visit education.alaska.gov/assessments/science

■ Median Score Summary — By Grade

Grade	Group	# Tested	Scale Score Median/Mean	400	500	600	700	800
	School	4		Data not sl	hown to protect stu	dent privacy		
5	District	9,999	550/555		_	—		
	State	99,999	525/535		-	-		
	School	0	N/A	N/A				
8	District	0	N/A	N/A				
	State	99,999	560/555		_	_		
	School	999	465/440	-				
10	District	9,999	550/560		-	•—		
	State	99,999	525/530		-			



Page 2

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This section shows the Score Summary by Grade, providing the median and mean scores, as well as the standard error of estimate (SEE) for the mean. Data is shown for the school as well as the district and state to assist with comparison. Note: see page 18 of this guide for more information about the median score, mean score, and SEE. Also, if the horizontal bar is replaced with a statement about student privacy, see the Data Privacy section on page 21 of this guide.



School Summary Report

District Name:District NameSubject:ScienceSchool Name:School Name 1Test Date:Spring 2022

Performance by Reporting Category

The table below shows how the performance of the school, district, and state compared to the state standard for proficiency on specific areas of the Science Assessment.

Grade	# Tested	Reporting Category	School	District	State
		Life Science	Δ	=	Δ
5	5 999	Physical Science	=	Δ	=
		Earth and Space Science	∇		Δ
		Life Science	N/A	N/A	Δ
8	0	Physical Science	N/A	N/A	
		Earth and Space Science	N/A	N/A	Δ
10	999	Life Science	Δ		Δ
10	799	Physical Science	=	Δ	=

SAMPLEREPORT

G

Performance Results Key

The school, district, or state

△ did better than the state standard for proficiency

☐ did about as well as the state standard for proficiency

 ▼ did not do as well as the state standard for proficiency
 ■ did not attempt any items in this category

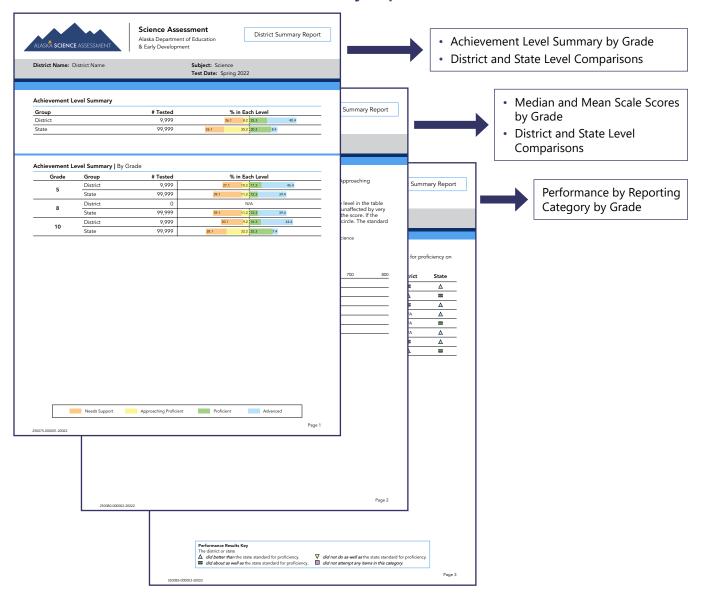
Page 3

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- This section shows the Performance by Reporting Category, represented by symbols. Information is shown for the school, district, and state. See page 19 for more information about performance by reporting categories for groups of students on the summary reports. Note: if the symbols are replaced with a statement about student privacy, see the Data Privacy section on page 21 of this guide.
- G This section shows the Performance Results Key, which provides the meaning of each of the four performance symbols.

NOTE: If N/A is reported on the Summary Report this indicates that no students tested in that particular grade.

Alaska Science Assessment District Summary Report



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Science Assessment

Alaska Department of Education & Early Development

District Summary Report

District Name: District Name

A

Subject: Science

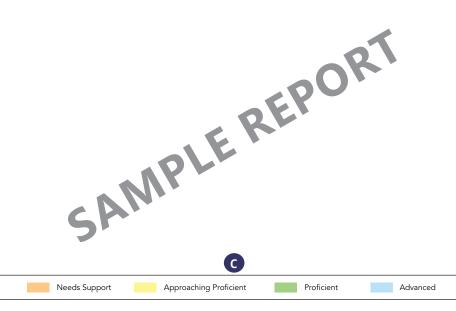
Test Date: Spring 2022

B Achievement Level Summary

Group	# Tested	% in Each Level			
District	9,999	26	5.1 8.2	25.3	40.4
State	99,999	26.1	35.2	30.3	8.4

D Achievement Level Summary | By Grade

Grade	Group	# Tested	% in Each Level		
5	District	9,999	27.1 10.2 17.3 45.4		
5	State	99,999	39.1 11.2 12.3 39.4		
8	District	0	N/A		
0	State	99,999	39.1 11.2 12.3 39.4		
10	District	9,999	30.1 9.2 16.3 44.4		
10	State	99,999	28.1 32.2 32.3 7.4		



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- A This section presents the district information.
- B This section shows the Achievement Level Summary: the number of students tested within the district, as well as the percentage of students that scored within each achievement level. For comparison, this table also shows the full population of students that tested within the state. Additionally, the percentages of students that scored in each achievement level within the state are shown to assist with comparison. Note: if the horizontal bar is replaced with a statement about student privacy, or if the data is displayed in ranges instead of a specific percentage, see the Data Privacy section and data suppression rules on pages 21–23 of this guide.
- This is the key that shows each color representing each achievement level within the horizontal graphs on page 1 of the District Summary Report.
- This section shows the Achievement Level Summary by Grade: the number of students tested within the district broken down by grade level, as well as the percentage of students that scored within each achievement level. Again, state percentages are shown for comparison. Note: if the horizontal bar is replaced with a statement about student privacy, or if the data is displayed in ranges instead of a specific percentage, see the Data Privacy section and data suppression rules on pages 21–23 of this guide.



District Summary Report

District Name: District Name

Subject: Science

Test Date: Spring 2022

Achievement Levels

Overall scores on the Science Assessment are divided into four achievement levels: Needs Support, Approaching Proficient, Proficient, and Advanced.

Median Scale Scores

The number of students, median scale score, and standard error are reported at the District and State level in the table below. The median is the middle number in an ordered list of numbers. Unlike a mean (average), it is unaffected by very low or very high test scores. The —— symbol shows the students' scale score where the dark circle is the score. If the students were to test again, the students' scores would likely fall within the lines on either side of the circle. The standard error decreases as the sample size increases.

For more information on the Alaska Science Assessment please visit education.alaska.gov/assessments/science

Median Score Summary — By Grade

	Grade	Group	# Tested	Scale Score Median/Mean	400	500	600	700	800
	5	District	9,999	550/555		_	—		
	3	State	99,999	525/535		-			_
	8	District	0	N/A	N/A				
	0	State	99,999	560/555		_	—		_
	10	District	9,999	550/560		-	•—		
		State	99,999	525/530		-			



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This section shows the Score Summary by Grade, providing the median and mean scores, as well as the standard error of estimate (SEE) for the mean. Data is shown for the district as well as the state to assist with comparison. Note: see page 18 of this guide for more information about the median score, mean score, and SEE. Also, if the horizontal bar is replaced with a statement about student privacy, see the Data Privacy section on page 21 of this guide.



District Summary Report

District Name: District Name

Subject: Science

Test Date: Spring 2022

Performance by Reporting Category

The table below shows how the performance of the district and state compared to the state standard for proficiency on specific areas of the Science Assessment.

Grade	# Tested	Reporting Category	District	State
		Life Science	=	Δ
5	9,999	Physical Science	Δ	=
		Earth and Space Science	=	Δ
		Life Science	N/A	Δ
8	0	Physical Science	N/A	=
		Earth and Space Science	N/A	Δ
10	0.000	Life Science	=	Δ
10	9,999	Physical Science	Δ	=

SAMPLEREPORT

Performance Results Key
The district or state

△ did better than the state standard for proficiency.

□ did about as well as the state standard for proficiency.

□ did not do as well as the state standard for proficiency.

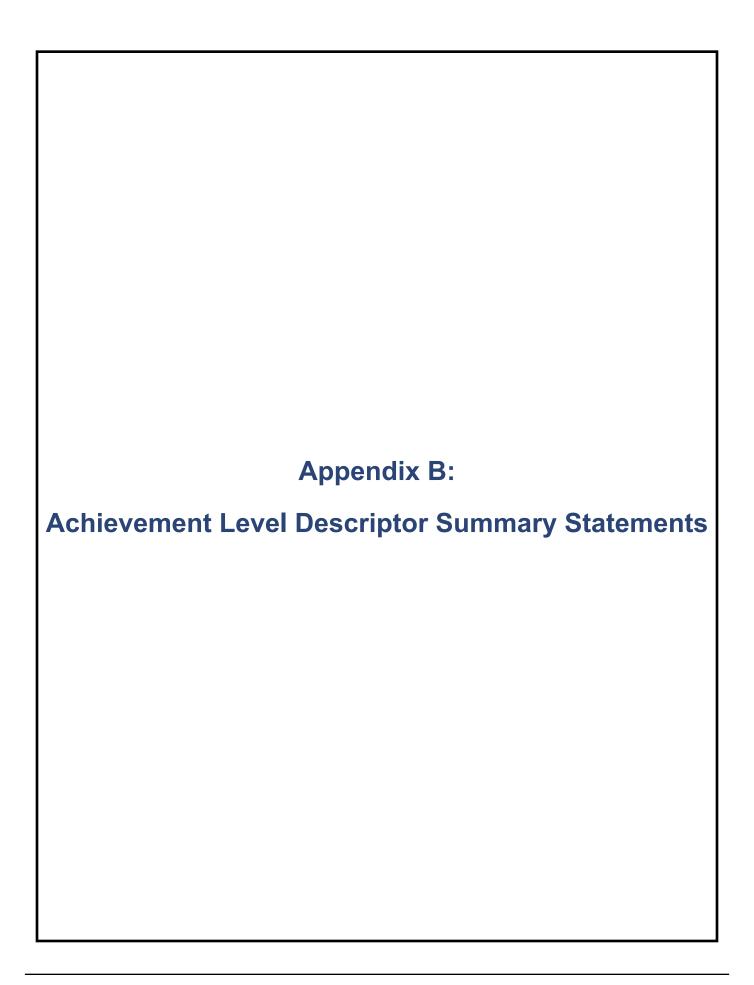
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- This section shows the Performance by Reporting Category, represented by symbols. Information is shown for the district and state. See page 19 for more information about performance by reporting categories for groups of students on the summary reports. Note: if the symbols are replaced with a statement about student privacy, see the Data Privacy section on page 21 of this guide.
- G This section shows the Performance Results Key, which provides the meaning of each of the four performance symbols.

NOTE: If N/A is reported on the Summary Report this indicates that no students tested in that particular grade.

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Achievement Level Descriptors

Grade 5

Achievement Level	Description
Advanced	The student displays a highly developed conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can construct an argument that includes the interdependence of organisms in a changing environment; obtain and evaluate evidence from multiple sources to design a solution to a problem involving the transfer of energy; and use evidence to generate and evaluate multiple solutions that reduce the impacts of natural Earth processes on humans based on criteria and constraints.
Proficient	The student demonstrates a sufficient conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can make a claim about the merit of a solution to a problem caused when an environment changes and affects the types of plants and animals that live there; plan and conduct an investigation that fairly tests a phenomenon involving the transfer of energy (e.g., moving objects, sound, light, heat, electric currents); and use evidence to design a possible solution to reduce the impacts of natural Earth processes on humans.
Approaching Proficient	The student shows a foundational understanding by using some science and engineering practices, crosscutting concepts, and a partial understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can explain a cause-and-effect relationship between an environmental change and an organism responding to stimuli; describe the purpose of an investigation related to energy transfer (e.g., moving objects, sound, light, heat, electric currents); and use evidence to describe how natural Earth processes negatively impact humans.
Needs Support	The student shows a basic understanding by using science and engineering practices, crosscutting concepts, and/or a basic understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can identify an environmental change that could impact a plant or an animal; identify examples showing a transfer of energy; and identify possible negative impacts to humans from a natural Earth process (e.g., earthquake, volcano, flood, landslide).

Achievement Level Descriptors

Grade 8

Achievement Level	Description
Advanced	The student displays a highly developed conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can use reasoning and evidence of interactions within an ecosystem to predict future interactions based on patterns; plan an investigation to provide evidence that the change in an object's motion depends on specific variables, such as the initial motion of the object, the total forces acting on the object, and the mass of the object; and develop and use a model of the Earth-Sun system, including Earth's atmospheric circulation and tilt, to describe the cyclic patterns of seasons (with emphasis on how community locations can affect seasonal severity in Alaska).
Proficient	The student demonstrates a sufficient conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can make sense of phenomena related to resource availability and patterns of interactions among organisms, organism abundance, and nonliving parts of an ecosystem; conduct an investigation involving the change in motion of an object and gather evidence identifying various factors affecting the object's motion (with emphasis on Newton's first and second laws); and develop and use a model of the Earth-Sun system, including Earth's tilt, to describe the cyclic patterns of seasons (with emphasis on examples of seasonal severity in Alaska).
Approaching Proficient	The student shows a foundational understanding by using some science and engineering practices, crosscutting concepts, and a partial understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can analyze and interpret patterns and make connections between resource availability and organism abundance, use mathematical thinking to explain how changes in an object's motion can be due to the degree of balanced or unbalanced forces acting on the object as well as the mass of the object, and use a model of the Earth-Sun system to explain how seasons occur.
Needs Support	The student shows a basic understanding by using science and engineering practices, crosscutting concepts, and/or a basic understanding of life science, physical science, and earth and space science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can describe how a change in resource availability can result in changes in a population of organisms, use information from a model to recognize that an object subjected to balanced forces does not change its motion and that an object subjected to unbalanced forces does change its motion, and use a model of the Earth-Sun system to compare the seasons of the northern and southern hemispheres.

Achievement Level Descriptors

Grade 10

Achievement Level	Description
Advanced	The student displays a highly developed conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science and physical science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can compare models illustrating photosynthesis and cellular respiration to analyze the differences in how they cycle matter between the biosphere, atmosphere, hydrosphere, and geosphere; prioritize the criteria and make trade-offs as necessary to further reduce environmental impact and loss of biodiversity while still addressing the needs of humans within the environment; predict the relative change in the wavelength of a wave when it moves from one medium to another, resulting in different wave speeds based on the mathematical relationship $v = f \lambda$, and express that relative change in terms of cause (different media) and effect (different wavelengths but same frequency); and make and refine predictions based on kinetic molecular theory about how forward and reverse rates of reactions will be affected by changes in the conditions of a reaction at equilibrium.
Proficient	The student demonstrates a sufficient conceptual understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science and physical science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon between the biosphere, atmosphere, hydrosphere, and geosphere; design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity; use mathematical representations to qualitatively support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media; and make arguments based on kinetic molecular theory to explain how altering conditions affects the forward and reverse rates of a reaction at equilibrium.
Approaching Proficient	The student shows a foundational understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science and physical science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can describe the role of photosynthesis and cellular respiration in the cycling of carbon between the biosphere, atmosphere, hydrosphere, and geosphere; identify solutions for reducing the impacts of human activities on the environment and biodiversity; identify mathematical representations that qualitatively support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media; and refer to aspects of kinetic molecular theory to explain how altering a condition of a reaction affects the forward and/or reverse rate of the reaction at equilibrium.
Needs Support	The student shows a basic understanding by using science and engineering practices, crosscutting concepts, and an understanding of life science and physical science disciplinary core ideas to make sense of phenomena and solve problems. For example, students can recognize the role of photosynthesis and cellular respiration in the movement of carbon between different spheres on Earth; identify the impacts of human activities on the environment and biodiversity; identify that waves travel at different speeds through solids, liquids, and gases and that higher-frequency waves have shorter wavelengths; and identify that a reaction can move in both forward and reverse directions.





Educator Guide to Assessment Reports 2022